BULLETIN
du MUSÉUM NATIONAL
d'HISTOIRE NATURELLE

PUBLICATION BIMESTRIELLE

zoologie

280

N° 403 SEPTEMBRE-OCTOBRE 1976

BULLETIN
du
MUSÉUM NATIONAL D'HISTOIRE NATURELLE
57, rue Cuvier, 75005 Paris

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International Standard Serial Number (ISSN) : 0027-4070.

BULLETIN DU MUSÉUM NATIONAL D'HISTOIRE NATURELLE
3e série, nº 403, septembre-octobre 1976, Zoologie 280

Two new species of *Echiura* from Madagascar with a note on the male of *Metabonellia haswelli*

by Alan J. Dartnall *

Résumé. — Deux nouvelles espèces d'*Echiura* sont décrites du Grand Récif de Tuléar, Madagascar. Une des espèces est signalée aussi en Australie. Le mâle de *Metabonellia haswelli* (Johnston et Tiegs, 1920) est décrit pour la première fois.

Abstract. — Two new species of *Echiura* are described from the Great Reef of Tuléar, Madagascar. One of the species is also recorded from Australia. A description is given of the male of *Metabonellia haswelli* (Johnston and Tiegs, 1920).

Introduction

The echiuran material described in this paper results, in the main, from the studies of Dr B. Thomassin upon the reef communities of the Great Reef of Tuléar, Madagascar. The opportunity has been taken to include an extra bonellid record from Australia and a description of the male of *Metabonellia haswelli* (Johnston and Tiegs, 1920).

The taxonomic scheme followed is that of Stephen and Edmonds (1972). Type and voucher material has been deposited in various Museums referred to in the lists by initial abbreviations viz. : Australian Museum, Sydney = AM ; British Museum (Natural History), London = BMNH ; Muséum national d'Histoire naturelle, Paris = MNHN ; Tasmanian Museum, Hobart = TM.

BONELLIIDAE

Genus **BONELLIA** Rolando

Bonellia sabulosa sp. nov.
(Fig. 1-2)

Description of female

Body sac-like with a long proboscis, bifurcate at the tip. The specimens available were in various stages of expansion and contraction. The relative proportions of body

* *Museums and Art Galleries of the Northern Territory, P. O. Box 4646, Darwin, 5794, Australia.*

and proboscis form may be seen in figure 1. The specimens were white in colour (preserved in formalin). The epidermis is thin and transparent on the dorsal surface and thicker and verrucose on the ventral surface particularly towards the extremities of the body.

In three specimens from station 843A (see locality details) a longitudinal band of small white papillae arranged roughly in two rows is found on the ventral surface. The band of papillae extends along the body from the anus to the bifurcation of the proboscis. On the proboscis the papillae are visible from both sides under low power magnification.

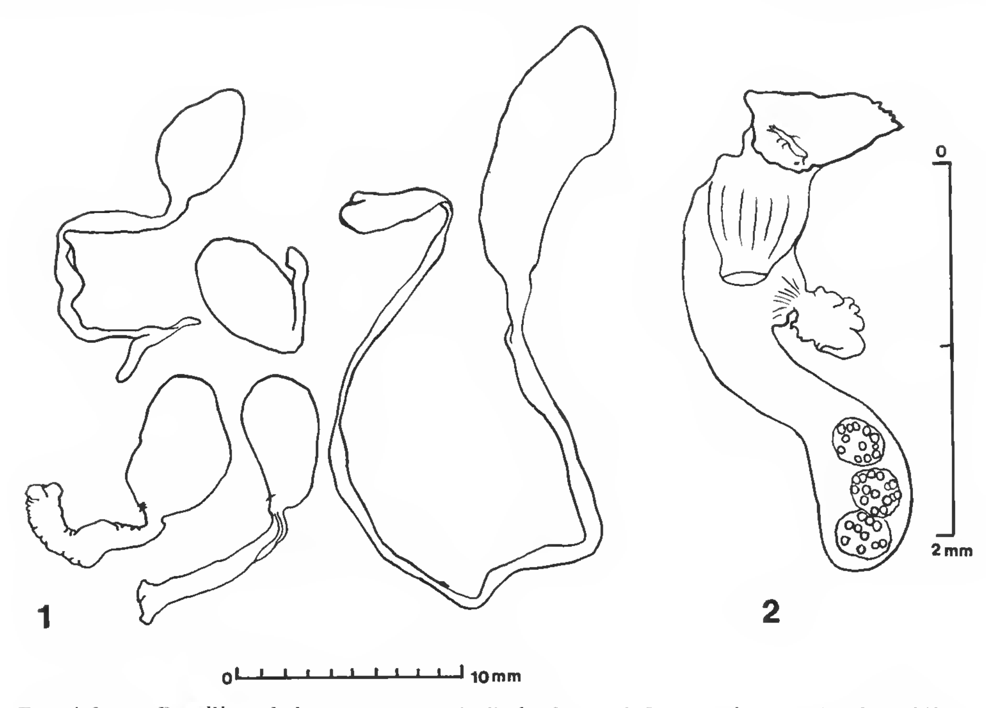


Fig. 1-2. — *Bonellia sabulosa* sp. nov. : 1, Body form of five specimens ; 2, Nephridium.

A pair of setae is present, similar in form to those described from *Bonellia pilosa* Dartnall, 1973. Each seta is about 1.5 mm long and has a reflexed tip.

The general anatomy of the female is similar to that of *B. pilosa*. An intestinal siphon is present and a pair of anal vesicles arise from the intestine near the anus. The anal vesicles are about 2.5 mm long and have about forty branches, each branch terminating in a ciliated funnel.

One nephridium is present. In some specimens the nephridium was surrounded by the first convolution of oesophagus and foregut. The nephridium is found either on the right or the left side. Developing eggs were found in the nephridia of four of the females available. Some nephridia were empty and deflated ; others gravid and swollen. The nephridial form is illustrated in figure 2. The nephrostome is basal.

The ovary is spread along the ventral blood vessel. A neuro-intestinal linking vessel is present.

DESCRIPTION OF MALE

The male is apparently nearly identical to that of *B. pilosa* (*loc. cit.*). It is about 0.8 mm long, has two identical hooked setae (except in two specimens from a female from station 629 where no setae were apparent), a vestigial gut and a single nephridium which opens subterminally. As in *B. pilosa* the males were all found in the pharynx of the females ; no males were found in any other part of the body or on the proboscis. The reflexed tail so apparent in males of *B. pilosa*, was present in one male of the series but not apparent in the remaining individuals (i.e. one of four).

Type locality and holotype :

The Great Reef of Tuléar, off S.W. Madagascar is designated the type locality. The holotype is one of nine specimens collected from a 50 dm³ shovelled sample of a gravelly, coral bank on the reef flat at infralittoral level. Collected 12.IV.1972 ; B. THOMASSIN (station 629), MNHN.

Allotype : ♂ AF882 (MNHN) ; from ♀ from station 843B (see below).

Paratype material : Eight specimens from same sample as holotype (four in AM, four in TM). Five specimens from 26 dm³ gravel, Grand Recif de Tuléar, Madagascar at the entrance of an outer creek (« Grande Crique ») on the reef front at 10 m depth. Collected 8.VII.1972 ; B. THOMASSIN (station 843A), TM. Seven specimens from 14 dm³ gravel at station 843B (same locality details as 843A), MNHN.

Other material : Eleven specimens from 35 dm³ gravel from gravel ridge at mouth of outer creek, Great Reef of Tuléar, Madagascar. Collected 6.VII.1972 ; B. THOMASSIN (station 837). Three specimens from 40 ft, One Tree Island, Great Barrier Reef, Australia. Collected 4.X.1972 ; P. HUTCHINGS (AM).

DISCUSSION

The new species is the second species of *Bonellia* reported from Madagascar. It may be distinguished from *Bonellia pilosa* Dartnall by the absence of investing hairs on the body and by the branching tubules of its anal vesicles. It is apparently close to *Bonellia punicea* Sluiter, 1891, for which he type locality is Krakatoa and with which it may yet prove to be conspecific. In that case SLUITER's name may, eventually, take precedence. However, the female of *B. punicea* is supposed to have a body shaped like a ball which none of the specimens to hand resemble. Also, the white papillae of *B. punicea* are denser at the ends of the body, a condition not apparent in the three specimens (from Madagascar) which carried white spots on the body.

Metabonellia haswelli (Johnston and Tiegs, 1920)
(Fig. 3-6)

The male of this species has not been described. Two female specimens of *M. haswelli* were made available from the collections of the Australian Museum, Sydney (from Fairlight, Manly, New South Wales ; collected 2.VI.1959 ; E. C. POPE and party).

The nephridia of the female specimens were fully expanded and consisted of a proximal,

heavily-banded area about 6 mm long followed by a median and a terminal sac each about 16 mm long carrying the nephrostome at their junction.

This contrasts with JOHNSTON and TIEGS' (1920) figure 1 of plate XV and their account in which any subdivision of the " uterus " was not emphasised though the authors did point out " that neither specimen was sexually mature ".

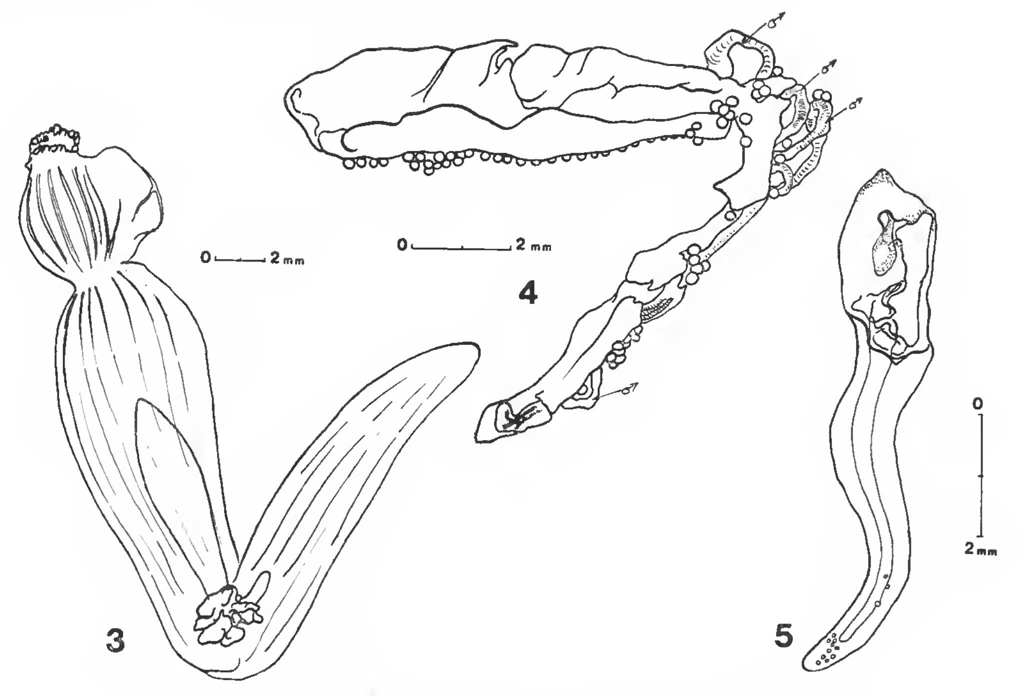


FIG. 3-5. — *Metabonellia haswelli* : 3, Nephridium ; 4, Nephridial tissue mass with eggs and embedded males ; 5, Male.

The nephridium of each specimen contained an elongated, yellowish mass of tissue with eggs embedded in, and adhering to the surface. In one specimen males were absent ; in the other males were found embedded in the nephridial tissue mass.

The males removed from the tissue were about 8 mm long. The male possesses a single nephridium and an ill-defined gut. The coelom contained a few sperm morulae. Just behind the anterior end the surface of the animal is folded into a hood shape which is applied to the tissue mass. I have been unable to determine whether this area of the male body secretes the material in which the eggs are embedded or whether the male uses this area as an attachment sucker. The males examined had neither setae or an anal clasper.

Sections of the nephridial mass were cut at 10 μ and stained with Erhlich's haematoxylin and eosin. The tissue is vacuolar, stains blue with haematoxylin and encloses the eggs. The eggs are about 0.2 mm in diameter, possess a central nucleus and the cytoplasm is bordered with large globules. Connections between the tissue and the enclosed eggs were also observed (see fig. 6).

This work was started to test the hypothesis that the echiurans from south-eastern Australia attributed to genus *Bonellia* deserved separation from that genus. Later it was found that generic separation had been made by STEPHEN and EDMONDS (1972) by erection of genus *Metabonellia*. This description of the male of *M. haswelli* supports the action of those authors. The species placed in the genus all have males without claspers.

The significance of the situation in which the males of *M. haswelli* are found must remain for a worker with access to living specimens who can ascertain whether the tissue mass is an artefact of preservation.

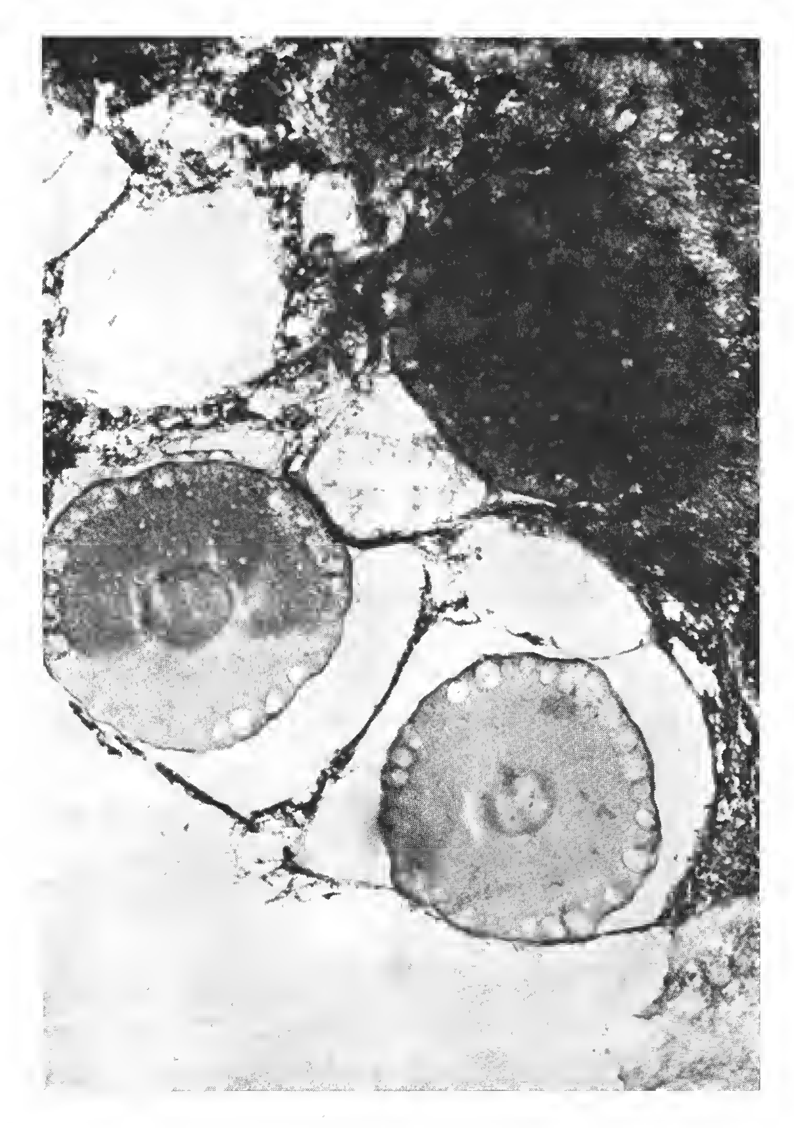


FIG. 6. — *Metabonellia haswelli*. Section of nephridial mass.

THALASSEMATIDAE

Genus **OCHETOSTOMA** Leuehkart and Ruppell

Ochetostoma punicea sp. nov.
(Fig. 7-8)

DESCRIPTION

Body form is as shown in figure 7. The proboseis is firmly attached to the body and is short and stumpy with its lateral edges turned inwards so that they meet near the mouth. The edges, however, are not fused. The proboscis is about 9 mm long and about 7.5 mm wide at its widest part (in the holotype) and is pink in colour (formalin preserved).

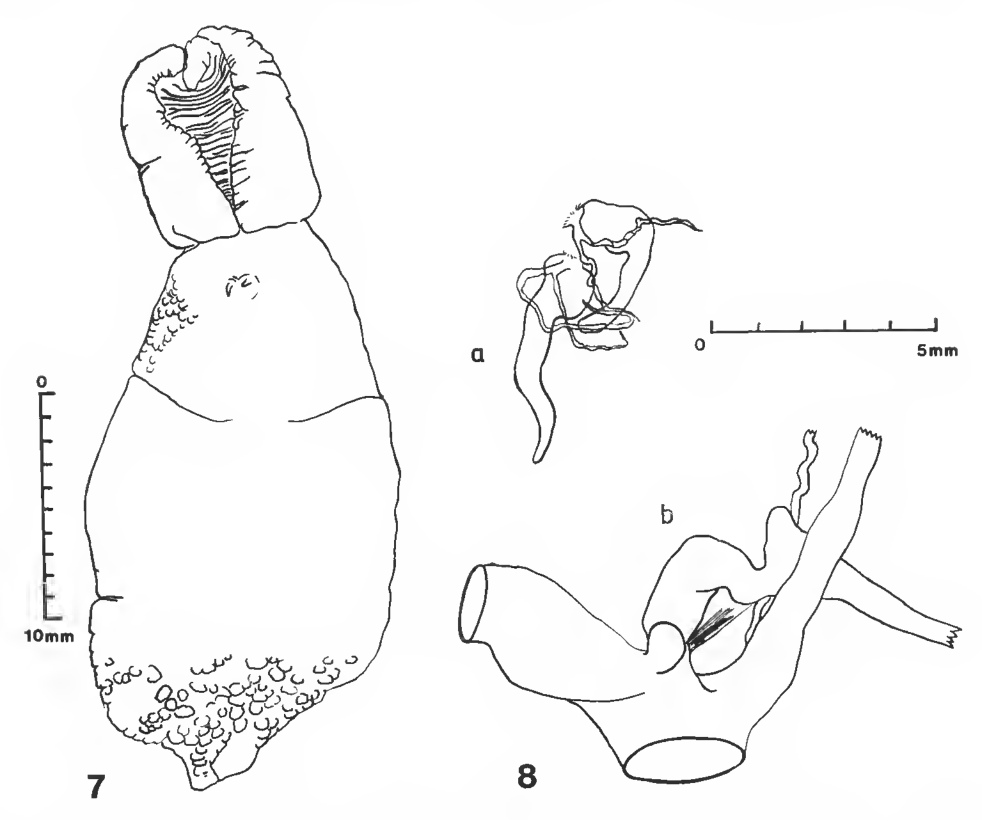


FIG. 7-8. — *Ochetostoma punicea* sp. nov. : 7, Body form (holotype) ; 8, *a*) anterior and posterior nephridia from right-hand side of body showing nephrostomes, *b*) rectum, anal vesicles and rectal caecum with mesentery to nerve cord.

The body is about 28 mm long and about 14 mm across its greatest width. The anterior part of the body carries a pair of ventral setae and the body surface is thickened and papillate especially on the dorsum and the ventro-lateral shoulders. The median part of the body surface is thinner than the preceding and the outline of the internal organs can be seen through the body wall. The posterior portion is tough and opaque carrying prominent papillae attaining a millimetre in diameter. The end of the body is drawn out into an apical projection where the anus opens to the exterior. The body is pinkish-brown becoming browner where the papillae are more prominent.

The longitudinal muscles are present in nineteen or (in one specimen) eighteen bundles. Fasiculation of the oblique muscles is rather weak in the median and forepart of the body wall but clearly visible to the rear.

The setae are about 2.25 mm long ; the main stem is about 0.3 mm wide and 1.5 mm long. The setal apex is pointed and bent at about 45°. There is no interbasal muscle.

Two pairs of nephridia are present, both opening behind the setae. The nephrostomes are weakly spirally coiled. In the holotype the anterior nephridium is about 8 mm long and the posterior nephridium is about 10 mm long with the free end of the nephridium more tapered. The nephridia are brown in colour . A circumpharyngeal ring vessel is present.

A rectal caecum is present on the ventral surface of the gut. It is attached to the nerve cord by a mesentery. The anal vesicles are long (c. 19 mm), brown and unbranched. Ciliated funnels are scattered over the surface of each vesicle. The left anal vesicle, in all specimens, was found to follow the convolutions of the gut closely whilst the right anal vesicle ran along the body wall for about 2/3 of its length after which it bends back to attach to the intestine with a fine mesentery.

One specimen (from station 755) differs only in colour from the other specimens and this may be due to differences in preservation. Most of the body of the specimen is translucent and white except at the posterior end where it is pink..

Type locality and holotype : The Great Reef of Tuléar, off S. W. Madagascar is designated the type locality. The holotype is one of 27 specimens collected from 50 dm^3 sample of gravel and silty sand from a boulder tract on the reef flat of the N. Grand Recif. Collected 1.VI.1972 ; B. Thomassin (station 757), MNHN.

Paratypes : Twenty-six specimens from the same sample as holotype ; AM, BMNH, MNHN and TM. Twenty-five specimens from a further station (station 755) ; data identical to holotype details.

Discussion

Ochetostoma capense Jones and Stephen, 1955, has already been reported from the Tuléar region (Thomassin, 1973). *Ochetostoma punicea* sp. nov. shares a posterior apical projection with that species and appears similar in the structure of the anal vesicles and in the presence of a rectal caecum. The new species differs markedly in the number of longitudinal muscle bands — 7 in *O. capense*, 18/19 in *O. punicea*.

The other species of *Ochetostoma* with two pairs of nephridia and 18/19 longitudinal muscle bands are :

1. *Ochetostoma baronii* (Greeff, 1879) which has, however, branched outgrowths from the anal vesicles.

2. *Ochetostoma kefersteini* (ten Broeke, 1925) whose first pair of nephridia open anterior to the setae and which Stephen and Edmonds (1972) point out may be a *Listriolobus* because it is not known whether the oblique muscle layer of this animal is fasiculated.

3. *Ochetostoma myersae* Edmonds, 1963, which has a " strong, interbasal muscle " and whose body papillae are " soft, white and wartlike ", quite unlike the tough papillae of *O. punicea*.

These observations confirm the need, pointed out by Stephen and Edmonds (1972 : 427) for further study to define this genus. Also among the specimens sent to me for study by Dr Thomassin was an extensive series of animals from the Great Reef of Tuléar that I have determined as *Ochetostoma erythrogrammon* Leuckart and Ruppell, 1828. Variation among these specimens emphasises the need for samples from widespread geographic localities and the extensive synonymy provided by Stephen and Edmonds (*loc. cit.*) demonstrates the variety of opinion amongst authors concerning the species of *Ochetostoma*. Among the Tuléar specimens are individuals with nephridia varying from three to two pairs, with one specimen having two left-hand nephridia and three right-hand nephridia. Three specimens had the first pair of setae opening anterior to the setae and longitudinal muscle bands varied between 16 and 18. The significance of variation such as this depends on further samples.

Acknowledgments

This work commenced at the Tasmanian Museum, Hobart and was completed in the Museums and Art Galleries of the Northern Territory. I am grateful to both institutions for facilities provided. My thanks also to Dr Bernard Thomassin who allowed me to work on his material and was helpful in many other ways.

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Manuscrit déposé le 17 février 1976.

Bull. Mus. natn. Hist. nat., Paris, 3e sér., no 403, sept.-oct. 1976, Zoologie 280 : 1039-1046.

Achevé d'imprimer le 28 février 1977.

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6 564 004 5

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